

What's in the Sack?

An investigation inspired by "What's in the Sack?"
~ a poem by Shel Silverstein [*Where the Sidewalk Ends*, p. 111]

Imagine a little man weighed down by a great big sack on his back.

Define **packing capacity** as the fraction of total volume occupied by the particular contents. For example, if tennis balls had a 75% packing capacity, then a sack measuring 2 cubic feet and packed with tennis balls would contain 1.5 cubic feet of tennis balls.

Assume that the little man's sack is a sphere 6 feet in diameter.

1. If the packing capacity of pickles is 72%, and the average volume of a pickle is 5 cubic inches, how many pickles could be in the sack?
2. How many gallons of popcorn might be in the sack?

To investigate the following questions, estimate the average size of each item, and find its packing capacity experimentally.

3. How many marbles might be in the sack?
4. How many pounds of encyclopedia volumes might be in the sack?
5. What is the value of quarter dollars that might be in the sack?

Solutions

1. A sphere 6 feet in diameter has a volume of about 113.1 cubic feet or 195,300 cubic inches. 72% of the volume is 140,600 cu. in. and at 5 per pickle, the sack is holding 28,120 of them.

Other answers will vary. My informal lab test showed that a sack roughly 2 inches in diameter holds 100 quarter dollars and 43 small marbles. Cannot replicate the data – I cashed in my quarters.